

Upper Delaware River Cold Water Fishing & Boating



Economic Impact Study

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Prepared by:

*Friends of the Upper Delaware River and
Shepstone Management Company, Inc.*

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by Shepstone Management Company, Inc.



1.0 Background and Executive Summary

Several parties joined efforts in 2014 to sponsor a study of the economic impacts of the Upper Delaware River's boating and fishing industry on the region and, more specifically, to evaluate the potential impact of more consistent cold water releases from New York City's reservoirs.

That study concluded then current net present value of the cold water fishery, was an estimated \$414 million (\$305 million in economic activity plus another \$109 million in second home real estate values connected with that activity). It is further estimated that the value could be enhanced by \$274 million with more consistent cold water releases.

The [Delaware County Industrial Development Agency](#) together with the Community Foundation of South Central New York has funded this update, which is designed to further test these conclusions from the perspective of what a good year with consistent good releases might yield. It is an update and, therefore, brings forward some of the original data (e.g., the literature search), while re-examining the economy of the affected area.

This affected area is more fully described in Section 2.0, along with updated data on boating and fishing industry contributions to the economy and property value Impacts.

Section 3.0 is devoted to analyzing the impacts of previous release patterns compared to 2018 when there were much more consistently higher releases than in previous years.

Based on this data and that previously collected, Section 4.0 takes another look at the potential gains from more consistent cold water releases and the benefits to New York City and environs.

The study uses research and data from a number of sources to accomplish these tasks. The data is projected 20 years forward to generate a current discounted value of the income stream which can then be added to impacts on real estate values to yield a total impact figure that encompasses both. It concludes the following:

The final estimate of the current net present value of the cold water fishery, after considering both objective and subjective data sources, is an estimated \$759 million (\$507 million in economic activity plus another \$252 million in second home real estate values connected with that activity).

It is further estimated the value of the cold water fishery as both a boating and fishing resource, as well as a foundation for camping and second home visitation, would be enhanced by \$220 million with more consistent cold water releases (\$161 million in economic activity plus another \$59 million in second home real estate values connected with that activity).

Indeed, while 2011-13 data suggested an existing fishing and boating industry worth \$305 million (before considering second homes) and potential to add another \$203 million, the 2018 data took those numbers to \$507 million and

\$161 million, respectively. This indicates our original analysis was too conservative from the perspective of the potential unleashed by more even flows.

Adding in the second home values and potential increases in property values attributable to enhanced fishing and boating yields the following:

What's A River Worth?			
	Existing Value	Potential Added Value	Total Potential Value
Fishing & Boating Industry	\$ 507,000,000	\$ 161,000,000	\$ 668,000,000
Second Homes	\$ 252,000,000	\$ 59,000,000	\$ 311,000,000
Totals	\$ 759,000,000	\$ 220,000,000	\$ 979,000,000

It is also important to note every dollar spent at the fishing destination by anglers is accompanied by [another 61 cents spent en route to the location](#) for clothing, food, gasoline, supplies, etc. This means another \$309 million is now being spent on boating and fishing related activities *outside the immediately affected area*, with the potential to add another \$98 million from more consistent releases. Assuming 75% of such new money is spent in New York, that's another potential \$5.9 million in sales tax revenue for these areas.

Moreover, it is residents of the New York City metro area who own many of the second homes in the immediately affected region; as much as \$52.9 million of that \$252 million in second home value related to boating and fishing. Their properties could gain as much as \$15.3 million in value from a more consistent cold water releases protocol.

This serves as the basis for the primary recommendation, which is as follows:

A more reliable, consistent pattern of water releases from the NYC Delaware River basin reservoirs is needed to address chronic thermal stress concerns, alleviate dramatic fluctuations in river flows, and provide more water at the right time to protect cold water habitat and enhance recreational opportunities in the Upper Delaware River.

Adoption of such a water management strategy for the NYC Delaware River basin reservoirs necessary step in the right direction and would create additional economic opportunities as a direct result of a better flow regime. While it would not totally remove the possibility of low-flow days during peak weekends, it would definitely reduce the number of those days dramatically to great economic benefit to the region as a whole.

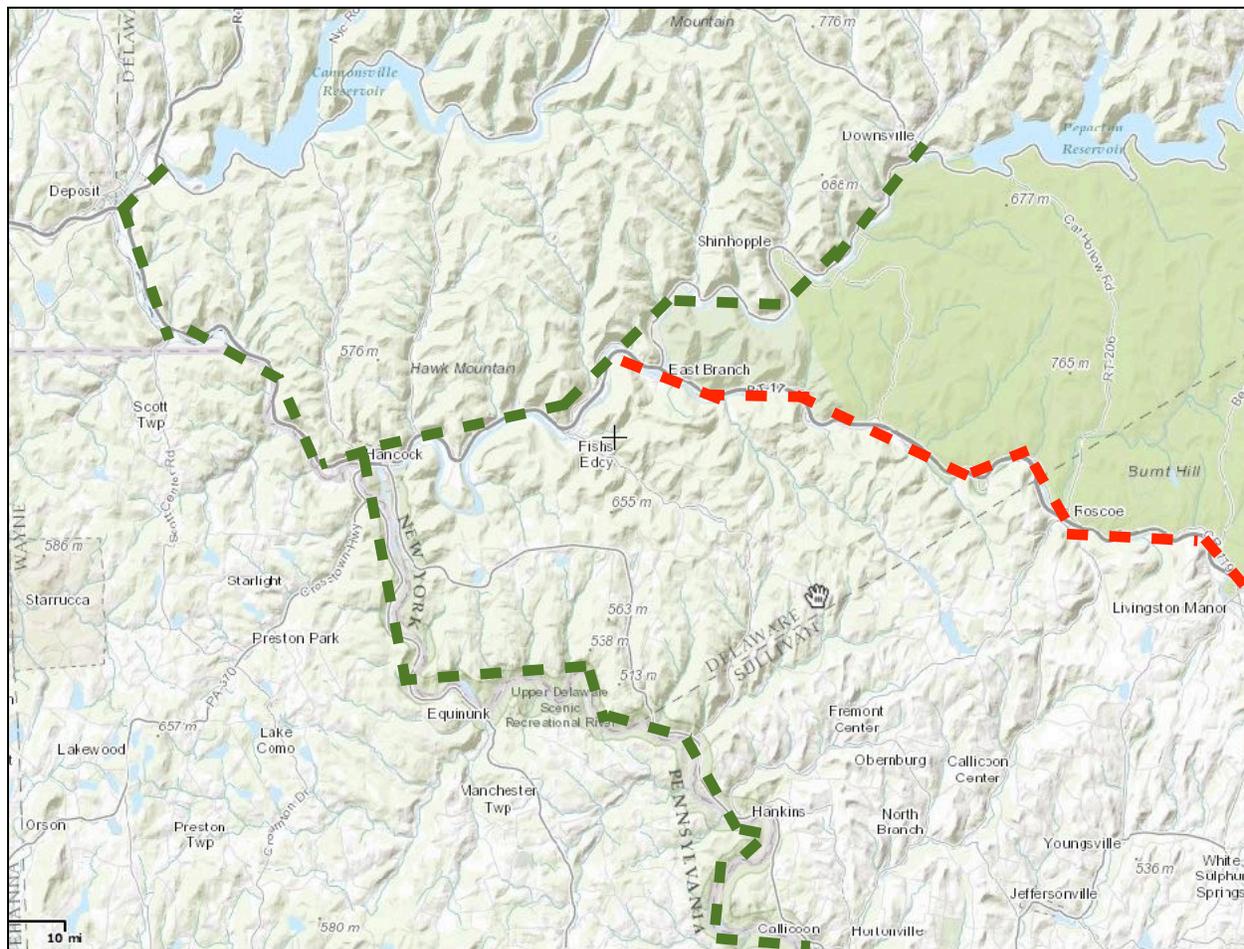
2.0 Economic Base of Affected Area

2.1 Fishing Industry Contributions to Economy

Delaware County's fishing industry cannot be segregated from that of adjoining Broome, Sullivan and Wayne Counties due to the principal fishing resource — the Delaware River including its East and West Branches — being shared among the four counties. The West Branch is a well-known fishery for anglers. This system, from Deposit in Broome and Delaware Counties to Callicoon, New York in Sullivan County, is the primary subject of this study.

Delaware County is clearly a major beneficiary of the fishing economy, but the economic contributions of the industry extend to the other counties as well. The map below identifies the primary study area, with the East and West Branches and the main stem of the Delaware (green) being those stretches most affected by cold water reservoir releases.

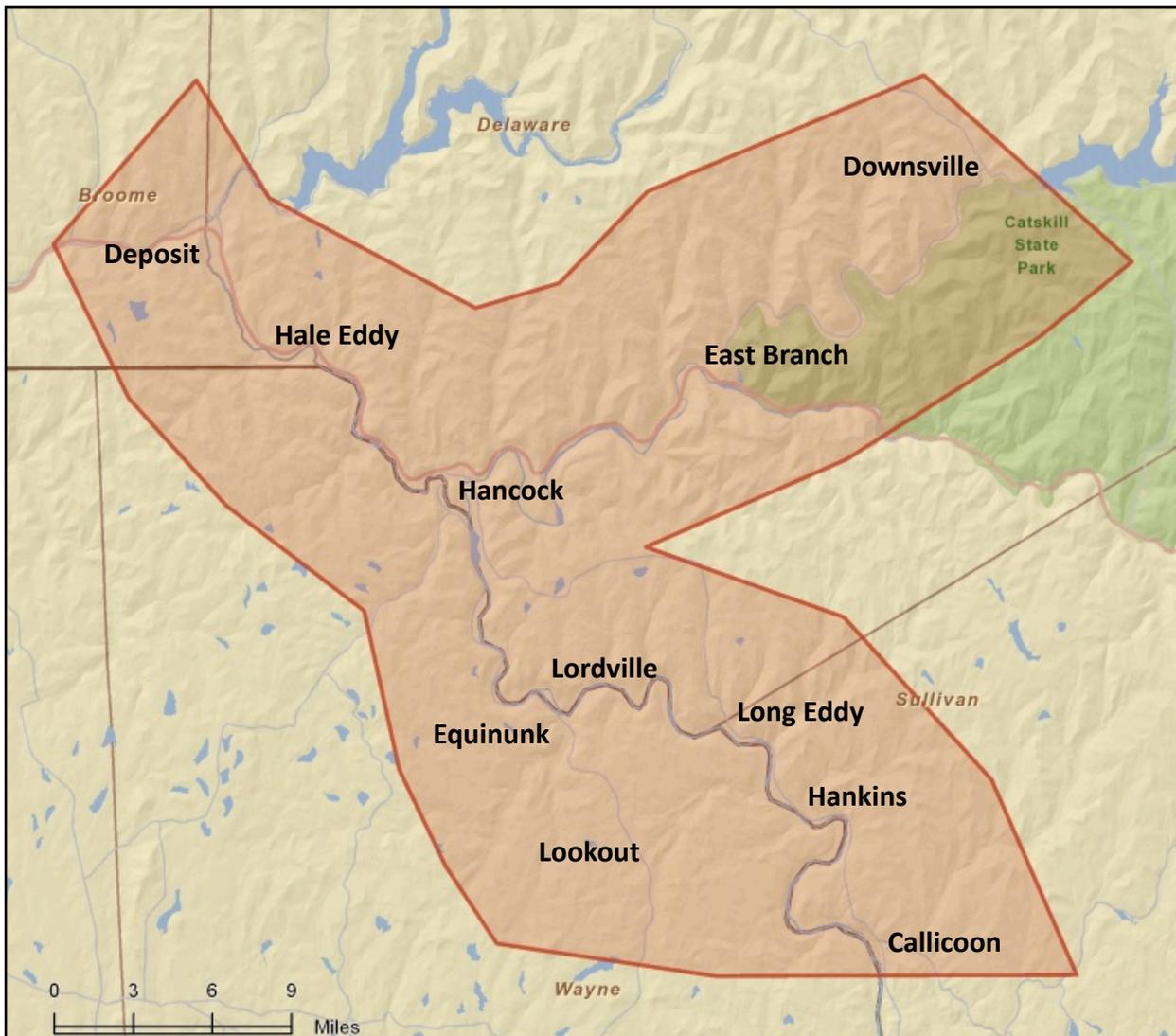
The Beaverkill (red), also a famous fishery in its own right, is not affected itself, but impacts the East Branch and upper main stem by introducing somewhat warmer water not influenced by cold water releases.



Upper Delaware River Cold Water Fishing & Boating - *Economic Impact Study*

There are 28.0 miles of the main stem involved from Callicoon to the confluence of the East and West Branches. The West Branch below the dam at the Cannonsville Reservoir constitutes another 16.9 miles of fishery. The East Branch, from the Pepacton Reservoir dam to the confluence is approximately 33 miles, bringing the total stream length directly affected by the cold water releases to 77.9 miles traversing two states and four counties.

The existing contributions of the fishing industry to the area involved are substantial and may be ascertained in several ways, starting with an inventory of businesses potentially affected by cold water releases; due to a significance dependence on fishing as an industry. A market area defined as 5-10 miles from the affected streams may be roughly defined as follows:



An inventory of businesses identified within this area follows. It is assembled by NAICS code using Dun & Bradstreet data and information from ESRI, a standard source of estimates and projections in most market analyses. Potentially affected sectors are highlighted in yellow.

Impacted Area Business Summary

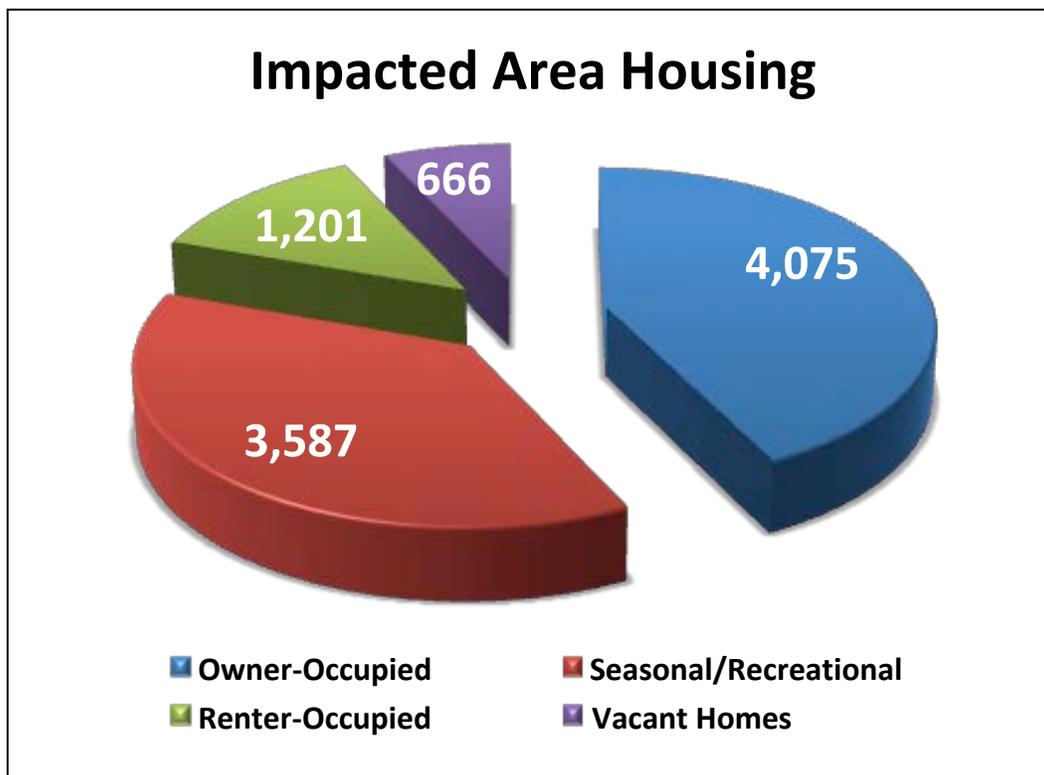
NAICS Codes	Businesses		Employees	
	No.	%	No.	%
Agriculture, Forestry, Fishing & Hunting	18	2.9%	57	0.8%
Mining	7	1.1%	132	1.7%
Utilities	1	0.2%	10	0.1%
Construction	48	7.8%	180	2.4%
Manufacturing	23	3.7%	331	4.4%
Wholesale Trade	19	3.1%	158	2.1%
Retail Trade	86	14.0%	489	6.5%
Motor Vehicle & Parts Dealers	12	1.9%	39	0.5%
Furniture & Home Furnishings Stores	2	0.3%	5	0.1%
Electronics & Appliance Stores	1	0.2%	1	0.0%
Bldg Material & Garden Equipment & Supplies Dealers	11	1.8%	78	1.0%
Food & Beverage Stores	12	1.9%	167	2.2%
Health & Personal Care Stores	6	1.0%	30	0.4%
Gasoline Stations	7	1.1%	58	0.8%
Clothing & Clothing Accessories Stores	1	0.2%	3	0.0%
Sport Goods, Hobby, Book, & Music Stores	10	1.6%	11	0.1%
General Merchandise Stores			26	
Miscellaneous Store Retailers	19	3.1%	77	1.0%
Nonstore Retailers	1	0.2%	6	0.1%
Transportation & Warehousing	28	4.5%	137	1.8%
Information	20	3.2%	129	1.7%
Finance & Insurance	16	2.6%	102	1.3%
Central Bank/Credit Intermediation & Related Activities	7	1.1%	32	0.4%
Securities, Commodity Contracts & Other Financial	1	0.2%	3	0.0%
Insurance Carriers & Related Activities; Funds, Trusts, etc.	8	1.3%	66	0.9%
Real Estate, Rental & Leasing	24	3.9%	64	0.8%
Professional, Scientific & Tech Services	18	2.9%	45	0.6%
Legal Services	6	1.0%	14	0.2%
Management of Companies & Enterprises	0	0.0%	1	0.0%
Administrative & Support & Waste Management & Remediation	8	1.3%	36	0.5%
Educational Services	15	2.4%	604	8.0%
Health Care & Social Assistance	22	3.6%	1,459	19.3%
Arts, Entertainment & Recreation	9	1.5%	59	0.8%
Accommodation & Food Services	81	13.1%	2,404	31.7%
Accommodation (Includes Summer Camps)	47	7.6%	2,153	28.4%
Food Services & Drinking Places	34	5.5%	251	3.3%
Other Services (Except Public Administration)	90	14.6%	472	6.2%
Automotive Repair & Maintenance	11	1.8%	43	0.6%
Public Administration	61	9.9%	704	9.3%
Unclassified Establishments	0	0.0%	0	0.0%
Total	616	100%	7,688	100%
Total of Potentially Impacted Businesses	156		2,833	

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Altogether, the summary of businesses indicates there are some 156 potentially affected businesses enterprises within this market area, which directly employ as many as 2,833 individuals. This includes summer camp employees.

Not every miscellaneous store retailer will sell fishing tackle or goods used by anglers but many will. There are also other non-retail sectors such as real estate services, that do gain at least tangential benefits from the fishing industry whenever an angler purchases a second home in the area, for example.

There were fully 3,587 homes in seasonal/recreational use within this relatively narrow corridor, representing 38% of all housing in 2010. This is addressed in further detail later, but it's clear the second home activity is affected by the streams and the activities around them. This means there are considerable indirect economic impacts on businesses far removed from fishing per se, including building and construction enterprises, for example.



Therefore, we can be reasonably confident these 156 businesses represent a fair accounting of those potentially affected economically by fishing as an industry. They include, on a direct basis, activities such fishing guide services, food and beverage stores, sporting goods stores, lodging facilities, restaurants, taverns, gasoline stations, convenience stores and assorted other enterprises. Although many gasoline sales locations are classified as convenience stores and classification issues may affect other categories of uses as well, it is the overall numbers that matter and they are significant. Also, the indirect impacts, of course, extend much further into all sectors of the regional economy, and well beyond the defined market area.

How much is spent at these businesses and then recirculated throughout the broader economy? There are numerous studies regionally and elsewhere in the U.S. that provide a basis for estimating those amounts. The following are some examples:

Socioeconomic Value of the Delaware River Basin

University of Delaware, 2011

This study, which is essentially a compilation of other studies, indicates the following with respect to fishing values:

- A 2001 US Fish and Wild Service study indicated the economic value of fishing is approximately \$53 per trip in 2010 dollars, and each angler typically makes 11-18 trips
- A 2002 study by Johnson, et al, indicated the economic value of fishing per trip, in 2010 dollars was \$62.79.

Estimated Economic Impact of Recreational Fishing on Minnesota Waters of Lake Superior

University of Minnesota, 2009

This analysis summarizes studies of Minnesota-based charter and non-charter recreational fishing activity connected with Lake Superior and indicates the following:

- Non-charter fishing was by anglers who were 91% residents and 9% non-residents.
- Resident anglers were estimated to have spent \$41.25 (1990 dollars) per trip based on a 1985 US Fish and Wild Service study and non-resident anglers were estimated to have spent \$22.03 per trip.
- Economic output multipliers of 1.3 to 1.8 were estimated to yield total impacts.
- Minnesota DNR data from 1990 indicated 45% of anglers came from hometowns within 75 miles of where they fished and 47% came from 76-300 miles away.

Angler Utilization and Economic Survey of the American Shad Fishery in the Delaware River

US Fish and Wildlife Service and NJ Division of Fish, Game and Wildlife, 1987

This study is focused on the American Shad but includes some data with implications for the fishery as a whole and indicates the following:

- Shad anglers spent an average of \$25.50 per trip in 1986.
- Shad anglers estimated each trip had a recreational value to them of \$50 per day.

Impacts of Tourism Along the Upper Delaware Scenic and Recreational River

Cornell University, 1981

This study was conducted in conjunction with preparation of the Management Plan for the Upper Delaware River and indicates the following:

- Some 40.5% of non-resident recreational groups primarily headed to Delaware County for recreation went there for fishing purposes. This number was 40.2% for Wayne County and 21.5% for Sullivan County visitors. Some 29.2% of those headed to that portion of the river between Callicoon and Hancock said the same.
- Some 17.2% of all non-resident groups primarily headed to the region as a whole for fishing purposes went to Delaware County, 40.5% went to Sullivan County and 16.2% went to Wayne County. Some 38.6% went to that portion of the river between Callicoon and Hancock.
- Non-resident recreationists visiting the Upper Delaware spent an average of 2.1 days fishing altogether. Non-resident trout fisherman spent an average of 1.5 days fishing. Some 18.4% of non-resident recreationists engaged in fishing and 10.9% engaged in trout fishing.
- Non-resident recreational groups (as opposed to individual recreationists) spent an average of \$56.70 within the Upper Delaware River valley (\$12.60 at restaurants, \$11.85 for groceries, \$7.54 on lodging/camping, \$12.09 at gasoline service stations, \$6.81 for boat rentals and \$5.81 for other items). The average per recreationist (as opposed to groups) was \$10.59.
- Some 29.6% of non-resident recreationists came from counties bordering on the river, another 29.3% came from 50-100 miles, 30.3% came from 100-150 miles, 5.8% came from 150-200 miles and 5.0% came from further away.

Economic Effects of Rivers on Local and State Economies

National Park Service, 1989

This study was conducted for the NPS by the USDA Forest Service and The University of Georgia. It addresses the Upper Delaware region and two others and indicates the following:

- The average river visitor, whether a resident of adjoining counties or a non-resident, came 98.50 miles in a group of two people, stayed 11.91 hours and spent \$1.12 on lodging, \$1.47 on transportation, \$13.21 on food and \$0.01 on other expenditures, for a total of \$19.42 locally. Statewide, the total was \$33.42.
- Every 1,000 additional non-resident visitors were projected to generate \$65,300 in additional local output (\$85,600 statewide), \$17,000 of additional employee

compensation (\$24,700 statewide), \$9,900 of added property income (\$14,600 statewide), \$26,900 of total income (\$39,300 statewide) and \$29,900 in value added (\$44,000 statewide). This includes direct, indirect and induced impacts.

- Economic multipliers for current use were estimated at 2.03 for gross output (2.19 statewide), 2.16 for total income (2.53 statewide) and 1.57 for employment (1.53 statewide). The numbers were somewhat lower for new water-related visitation; estimated at 1.84/2.01 for gross output, 1.94/2.28 for total income and 1.46/1.44 for employment.

The Money Generation Model

National Park Service, 1996-1997

This study outlined the basis for evaluating the economic contributions of national park system units and indicates the following:

- Travel expenditures per person for New York were estimated at \$70.72 for lodging and \$43.95 for meals. Pennsylvania figures were \$57.40 and \$37.54, respectively.
- Economic multipliers of 2.00 were used for lodging and food in New York with a comparable figure of 2.24 for Pennsylvania.

The Economic Impact of Mountain Trout Fishing in North Carolina

Responsive Management and Southwick Associates, 2009

This study evaluates the economic contributions of mountain trout fishing in North Carolina and indicates the following:

- In total, 92,769 mountain trout anglers (76,761 residents and 16,008 nonresidents) fished for 1.42 million days in North Carolina in 2008. They spent \$146 million and had a total economic output of \$174 million when indirect economic effects are factored in. [Suggests an average daily expenditure for resident and non-resident anglers of \$103 per day, one of the higher such figures found in these economic impact studies.]
- The typical resident mountain trout angler spent approximately \$65 per day on trip expenditures when mountain trout fishing in North Carolina; nonresidents averaged \$158 on trip expenditures. Annually, the typical resident mountain trout angler spent a little over \$500 on mountain trout fishing equipment in North Carolina.
- The typical resident mountain trout angler fished for mountain trout about 10 days in North Carolina in a year; the typical nonresident fished for about 5 days for mountain trout in North Carolina. Most trips taken by mountain trout anglers lasted only 1 day.

Economic Impact and Social Benefits Study of Cold Water Angling in Minnesota

University of Minnesota, 2002

This study examined cold water fishing on streams and Lake Superior in Minnesota and indicates the following:

- Anglers fishing streams year round spent on average \$29.37 per day in their home area and \$56.57 away from home while fishing. Money spent at home went primarily for fishing equipment (\$12.89) followed by fuel/oil (\$7.91) and non-restaurant food (\$5.14).
- The highest away expenses were recorded for lodging (\$11.59), restaurant food (\$11.07) and fuel/oil (\$10.38). Total direct sales due to anglers fishing streams year round amounted to over \$30 million, with another \$18 million in direct income. Total expenditures supported over 632 full and part time jobs.

Sportfishing in America

American Sportfishing Association, 2018

This study incorporates much of the data from the US Fish and Wildlife Service's 2016 study (see below) and indicates the following:

- The U.S. Fish & Wildlife Service's (USFWS) 2016 National Survey of Fishing, Hunting and Wildlife-Associated Recreation identifies fishing as one of the most popular outdoor recreational activities in the United States. As many as 49 million people altogether and 36 million persons aged 16 or older participate in the activity, and spend slightly less than \$50 billion annually on equipment, licenses, trips and other fishing-related items or events. These funds help create and support some 802,000 jobs in the United States.
- Freshwater fishing involved an estimated 30 million anglers in 2016 over 16 years of age, who generated expenditures and retail sales of \$33.3 billion, for a total economic output (including multiplier effects) of \$82.7 billion (which suggests a multiplier of 2.49). It included \$25.3 billion in salaries and wages for some 526,600 workers. This produced an estimated \$41.9 billion in Gross Domestic Product and \$10.5 billion in Federal, state and local taxes.
- The Middle Atlantic States (New Jersey, New York and Pennsylvania) had 9.7% of all anglers in the US (3,471,000 of whom 2,356,000 or 68% were freshwater fishermen.
- Middle Atlantic freshwater fisherman generated retail sales of \$1,628.9 million, with a total multiplier effect of \$2,868.2 billion, of which \$1,014.9 billion was salaries and wages, \$245.1 million was Federal tax revenues and \$191.3 million was state tax revenues, with some 19,900 jobs involved.

National Survey of Fishing, Hunting, and Wildlife-Associated Recreation

US Fish and Wildlife Service, 2016

This study, conducted every five years, analyzes the extent and economic impacts of the fishing recreation industry and indicates the following with respect:

- Freshwater anglers numbered 30.2 million. Freshwater anglers spent \$33.3 billion on freshwater fishing trips and equipment.
- Travel expenditures for non-Great Lakes freshwater fishing totaled \$13.5 billion or 40.6% of all freshwater fishing expenditures. This included food and lodging, which comprised \$5.1 billion or 15.3% of total expenditures. Others included the following:

Fishing Equipment	\$4.5 billion	13.4%
Auxiliary Fishing Purchases	\$3.0 billion	9.2%
Special Equipment Purchases	\$9.4 billion	28.2%
Other Fishing Expenses	\$2.8 billion	8.5%

- Freshwater anglers, excluding the Great Lakes, spent 372.6 million days fishing of which 127.4 million or 34% was spent on rivers and streams. They spent \$27.5 billion or \$993 per angler on average or \$73.84 per day.
- While residents of metropolitan statistical areas (MSAs) had lower participation rates in fishing than non-MSA residents, they still accounted for the majority of anglers. Some 13% of all MSA residents fished in 2016, but they composed 89% of all anglers. By comparison, non-MSA residents composed 11% of all anglers, but their participation rate was more than twice as high at 26%.

Larger MSAs had lower participation rates in fishing than smaller MSAs but composed more of the angler population. Large MSAs with populations of 1,000,000 or more had the lowest participation rate at 10%, but they made up 43% of all anglers. Medium MSAs with a population of 250,000 to 999,999 had a 16% participation rate and made up 23% of all anglers. Those MSAs with a population from 50,000 to 249,999 had a participation rate of 18% and composed 23% of all anglers.

New York Statewide Angler Survey

Cornell University Department of Natural Resources, 2007

This was a random survey of approximately 20,000 anglers who fished the freshwaters of New York State during the 2007 calendar year. It may be found at <http://www.dec.ny.gov/outdoor/56020.html> and indicates the following:

- Anglers spent an estimated 18.7 million angler days fishing New York's freshwaters in 2007. An angler day is defined as any part of a day that a person spent fishing.

- New York's resident and nonresident anglers collectively spent an estimated \$331 million at the fishing site and \$202 million en route to the fishing site. Almost one-third (30%) of the total at-location expenditures were made by out-of-state anglers. Average daily trip-related expenses (\$17.62 at-site plus \$10.76 en route) for all anglers was \$28.38 -- \$22.36 for residents and \$90.10 for nonresidents.
- It was estimated the main stem of the Delaware River (Hancock to Port Jervis) had 128,344 angler days of use in 2007 (down from 163,219 in 1988). An estimated 46,558 were from anglers who resided in DEC Region 3, some 48,778 were from other regions and 32,925 were from out-of-state. Those anglers were estimated to have spent \$3,687,358 at their fishing location and another \$2,521,404 en route. The average distance traveled by anglers was 78 miles.
- Cold water fishing in New York State represented 5.7 million angler days in 2007, of which an estimated 28% were for January through May, 51% for June through September and 21% were for October through December. The breakdown for the Delaware River main stem was similar at 32%, 52% and 16%, respectively. An estimated 61% of the East Branch's 56,152 angler days and 68% of the West Branch's 96,365 angler days were June to September. Some 28% of the West Branch activity was January to May.
- Delaware County represented an estimated \$11,103,441 in angler expenditures at their fishing location. Sullivan County anglers spent an estimated \$8,497,470 and Broome anglers spent an estimated \$1,271,391, for a total of \$20.9 million. Angler days totaled 405,486 for Delaware, 514,652 for Sullivan and 214,658 for Broome County. Anglers traveled an average of 85 miles to fish in Delaware County, 74 miles in Sullivan County and 23 miles in Broome County.
- The East and West Branches represented a total of 152,517 angler days or roughly 38% of the Delaware County total. The Delaware River main stem's 128,344 angler days represented 25% of Sullivan County angler days.



Fisheries Investigation of the Delaware Tailwaters

New York State Department of Environmental Conservation (NYSDEC) and Pennsylvania Fish and Boat Commission (PAFBC), 2018

NYSDEC and PAFBC have been jointly conducting a fisheries investigation of the Delaware River tailwaters (East and West Branches, plus the main stem downstream to Callicoon). This is coterminous with the reaches that are the subject of this economic impact study. The purposes is to collect data with which to develop a new trout management plan. The investigation has included a "creel" or angler survey. It involves individual interviews of anglers, fish measurements, recording of hours fished, counts of boats and recreational craft and other data about the effort, harvest, and size distribution of fish.

Progress reports to data reveal the following:

- A total of 3,851 angler trips made to the Delaware Tailwaters were documented in angler interviews. Some 2,782 or 72.2 % of these occurred along the West Branch.
- There was strong participation by both boat and wade anglers, many of whom were non-local anglers. Some 1,563 or 40.6 % were boat anglers and 2,278 or 59.1 % were wade anglers. A total of 3,325 or 86.3 % of anglers were non-local, based on origin by zip code.
- Relatively few trips were guided. Nearly all guided trips were for boat angling. There were 545 (14.1 %) guided trips and 3,229 (83.8 %) non-guided trips. Considerable participation by non-local guides was documented.
- Based on the 2018 creel data, the recreational fishery is focused almost entirely on trout, fly fishing is the predominant technique, and catch and release is widely practiced. Some 2,947 or 76.5 % of anglers used fly tackle and 3,649 or 94.7% specifically targeted trout.
- Overall catch rate was 0.06 trout/hour or 1 trout per 16.6 hours spent fishing. A total of 77% of anglers described themselves as "satisfied" or "very satisfied" with their fishing experience over the last three years. Only 3% of anglers were "dissatisfied" or "very dissatisfied." Angler satisfaction was not singularly attributable to catching many trout (26.8 %), catching large trout (36.6 %), or catching at least one trout over 20-inches (26.0 %).

There are numerous other economic impact studies indicating similar results. Overall, there are several factors that play into the economic impact of cold water fishing on the areas affected by New York City's reservoir releases. These include the following:

1. Freshwater anglers spend 12+ days per year fishing and spend approximately \$74 per fishing day on their hobby. Roughly 40% is spent on lodging, food and transportation

(gasoline), 50% is spent on equipment and with the remainder goes for other supplies and services.

2. Some 89% of anglers come from metropolitan areas, and 43% come from large metropolitan areas such as New York City. Fishing is also the primary reason visitors to the Delaware River region head to Delaware County.
3. There are direct, indirect and induced economic impacts from spending on fishing. The direct impacts consist of purchases made by anglers. The indirect impacts consist of the secondary effects of that spending as a restaurant pays for the food it uses to prepare meals, for example. The induced impacts are those relating to the fact a popular restaurant, for example, may attract a bank branch or bus stop to locate nearby. Multiplier effects can be segregated into these and other categories and range from a factor of 1.30 to 2.53, depending upon the extent of the area involved. Generally, a statewide multiplier will be higher than one applied to a local area such as being analyzed in this instance.

The National Park Service multipliers developed in evaluating the economic impacts of new water-related recreation visits to the Upper Delaware River are mid-range among the studies examined and, therefore, probably the closest to reality. They are 1.84 for gross output on a local basis and 2.01 on a statewide basis, 1.94/2.28 for total income and 1.46/1.44 for employment.

Given these as assumptions it is possible to assess the existing economic impact of fishing on the affected area, which yields the following regarding current non-property value impacts:

Current Estimated Non-Property Value of Local Fishing Economy				
River Sections	Estimated Angler Days	Estimated Expenditures in River Section	Indirect and Induced Value	Total Value
New York State				
East Branch	56,152	\$2,570,639	\$2,159,336	\$4,729,975
West Branch	96,365	\$4,411,590	\$3,705,735	\$8,117,325
Delaware River Main Stem	42,739	\$1,956,591	\$1,643,537	\$3,600,128
Total New York State	195,256	\$8,938,820	\$7,508,609	\$16,447,428
Pennsylvania	139,104	\$6,368,181	\$5,349,272	\$11,717,453
Total	334,360	\$15,307,001	\$12,857,881	\$28,164,881

Data from the *New York Angler Survey* was used to estimate angler days with one-third of the main stem days allocated to the study area. Pennsylvania side activity is assumed to be comparable to the New York side figures for the main stem and West Branch. Value per angler day, based on national data, is estimated at \$73.84. The *New York Angler Survey* indicates 62% of those expenditures are made at or near the fishing location. This suggests net spending of \$45.78 per day within the market area. This figure is then subjected to a multiplier of 1.84 for

indirect and induced impacts (another approach to estimating expenditures is addressed in Section 4.0).

This analysis indicates the fishing economy, based on 2018 data, generated minimum gross output of approximately \$28.2 million altogether or an average of roughly \$180,500 for each of the 156 businesses affected in some way by it. This alone, net present valued over 20 years at a 5% discount rate, represents a \$351.0 million value to the affected area, not including property value impacts or state level multiplier effects.

Most importantly, this estimated gross output represents an \$89.1 million or 34% increase over the estimated value of the gross output for the 2011-2013 period previously examined. This is the added value to be had from a more consistent reservoir water releases regimen that enables a season long cold water fishery. See Section 3.0 for further information.

There is also anecdotal information from the last two years of fishing activity. The following is a summary offered by [Cross Current Guide Service & Outfitters](#), one of several experienced fishing guide services operating in the area:

“My fly fishing business has been steadily growing for a variety of reasons but the dramatic growth I've experienced over the last 2 years has been mainly due to more water in the river. It's obvious to me and my staff that when NYC releases more water from the reservoirs, thus keeping the water cool and the trout healthy and not subject to thermal stress, the fishing experience greatly improves. This not only helps my operation but has an enormous positive economic impact for local businesses, people, and communities throughout the region downriver of the dams.”

Joe Demalderis, Cross Current Guide Service & Outfitters

2.2 Property Value Impacts of the Boating and Fishing Industry

The property value impacts from fishing are considerable. Some 3,587 or 38% of all housing units in the affected area in 2010 were second homes and occupied by households focused on recreation as a pursuit while staying in the area. Estimated housing growth since then suggests a total of 3,635 second homes today.

More importantly, housing units within the affected area have a current estimated average value of \$237,718, which is more than double the figure utilized in earlier 2014 version of this report. Both the current estimate and the previous one are ESRI figures based on American Community Survey data from the Census Bureau.

It is assumed the value of a second home is relative to the recreational pursuits to which it is put. As noted earlier NPS data indicates 29.2% of those headed to that portion of the river between Callicoon and Hancock were there to fish. This suggests a similar number of second homes have that as an underlying purpose.

Therefore, it is reasonable to assign that much of the second home value to this purpose, meaning the 3,635 second homes in the affected area represent a total value of \$252.3 million attributable to the fishing sector.

This brings the total current property and non-property value of the fishing industry in the affected area to an estimated \$603.3 million before considering other data and the multiplier effects of indirect and induced spending.

See Section 4.0 for further discussion.

3.0 Impact of Releases

Variability in river flows and water temperatures is a very serious issue for the boating and fishing industry. Indeed, the economics of fishing and boating depend upon instant information obtained by recreational users who acquire it over the internet.

In the Upper Delaware River, variability in river flows is influenced primarily by water releases from the New York City reservoirs. Boaters and anglers make decisions, based upon gauge data easily obtained from various mobile phone applications and websites, about whether or not to drive to these streams, and the communities near them, to spend the weekend and considerable money with local suppliers of goods and services.

Decisions whether to reserve rooms, rent equipment and/or dine out may get made on the basis of flow and temperature data from Thursday that is completely different on Saturday, given the current conditions of high variability in stream flows.

Stream flow, or the amount of water going down the stream at a given location at a given time, is influenced by amounts of precipitation, rates and velocities of runoff (which can be a factor of development conditions) and water releases from the New York City reservoirs (the Cannonsville and Pepacton, in this case).

The precipitation factor is, obviously, not controllable and runoff is only controllable over the long-term and in small proportion. The releases from the reservoirs are, therefore, by far, the most important factor, if for no other reason than they are more controllable in the short-term.

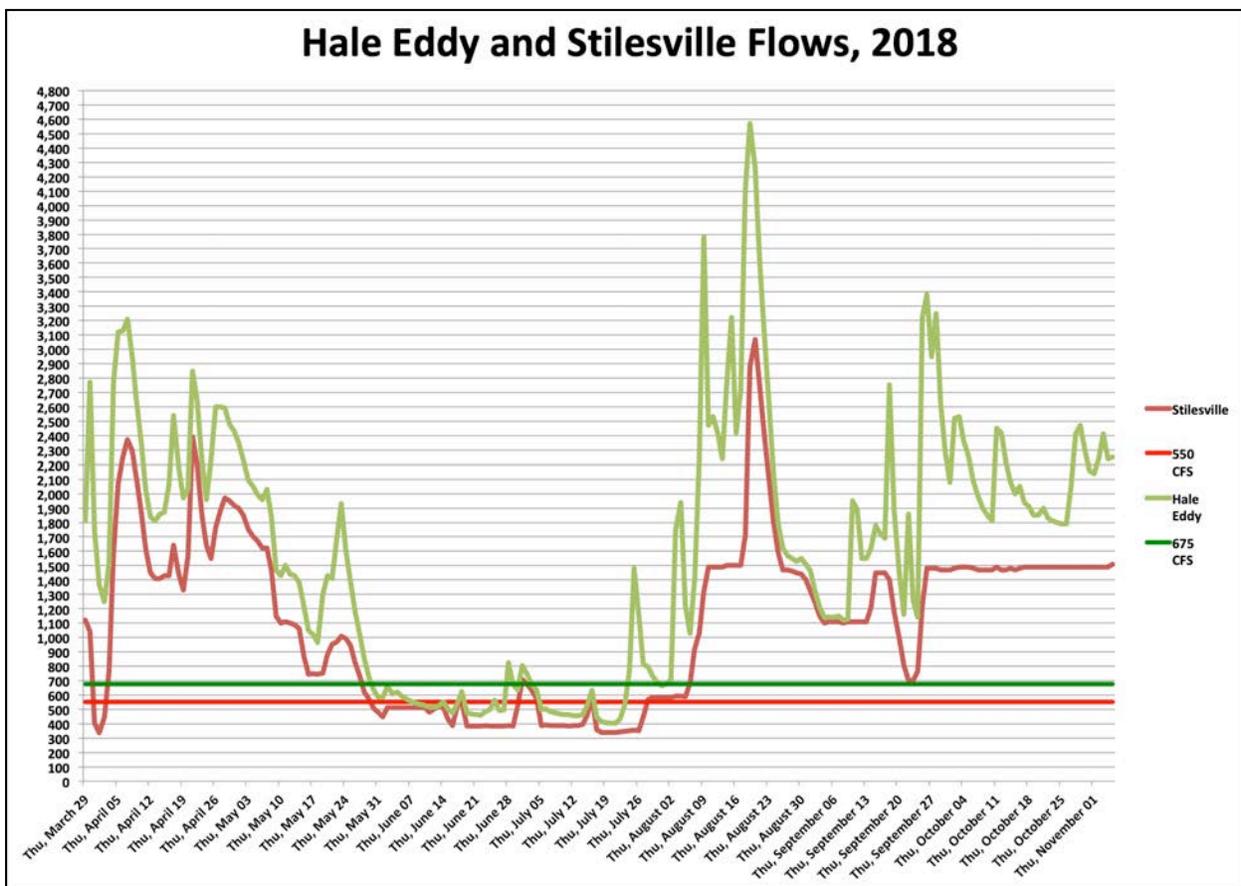


Cannonsville Reservoir Spillway

Detailed data on reservoir releases provides additional insights into their impact on the cold water fishery as well as the boating industry. Water releases themselves are not the sole determinant of the quality of the fishery. Rather, *consistent* flows are the critical factor and inconsistent reservoir releases exacerbate heavy precipitation issues and runoff problems that impact on stream flows. Inconsistent water releases directly impact the overall flow and can magnify the effects of these other issues, when they ideally should be helping to offset them.

Moreover, the number of days of low flow is misleading if anglers are under the impression low flows will persist and fishing might not be good. The timing of high and low flows is also instrumental to these sorts of judgments by anglers. That timing has been anything but even, as charts that follow indicate.

The 2014 study used a 725 cfs standard at Hale Eddy but further discussion with fishing guides suggests a 550 cfs level of even flow at Stilesville and/or 675 cfs at Hale Eddy are more appropriate measures of angler satisfaction although there are some additional factors as well, including, of course, temperature in the cases of some stream stretches (see discussion below regarding Lordville).



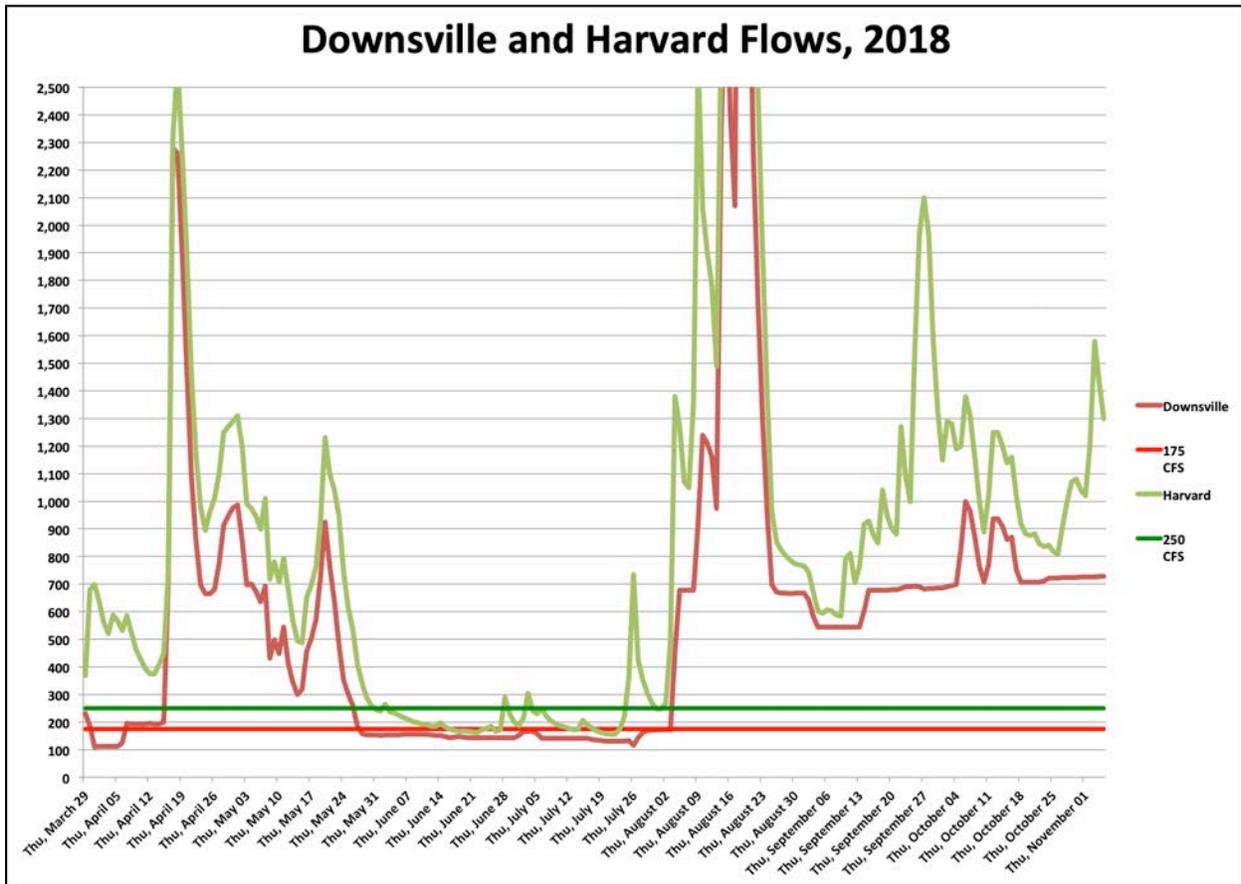
The preceding chart examines flows at USGS stations in Hale Eddy and Stilesville, New York. As the chart illustrates, there were wide variations in flows in 2018, weather being a major factor,

but it was, nonetheless, a much better year than the previously studied 2013 with respect to available flows for fishing purposes.

There were, in fact, only seven weekends in 2018 during which the weekend flows at either Stilesville or Hale Eddy were lower than 550 cfs or 675 cfs, respectively, or immediately preceded by such low flows (resultant from inadequate releases) that would lead anglers to expect poor weekend fishing conditions. There were an estimated 12 such weekends in 2018.

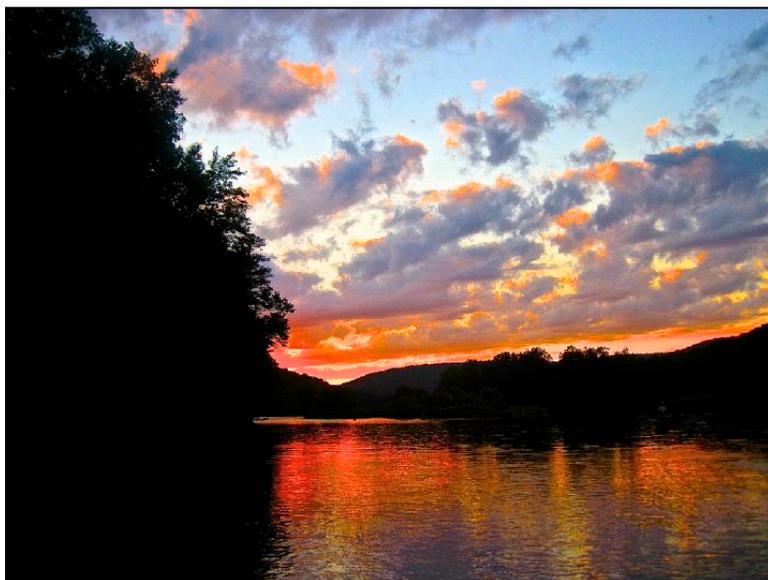
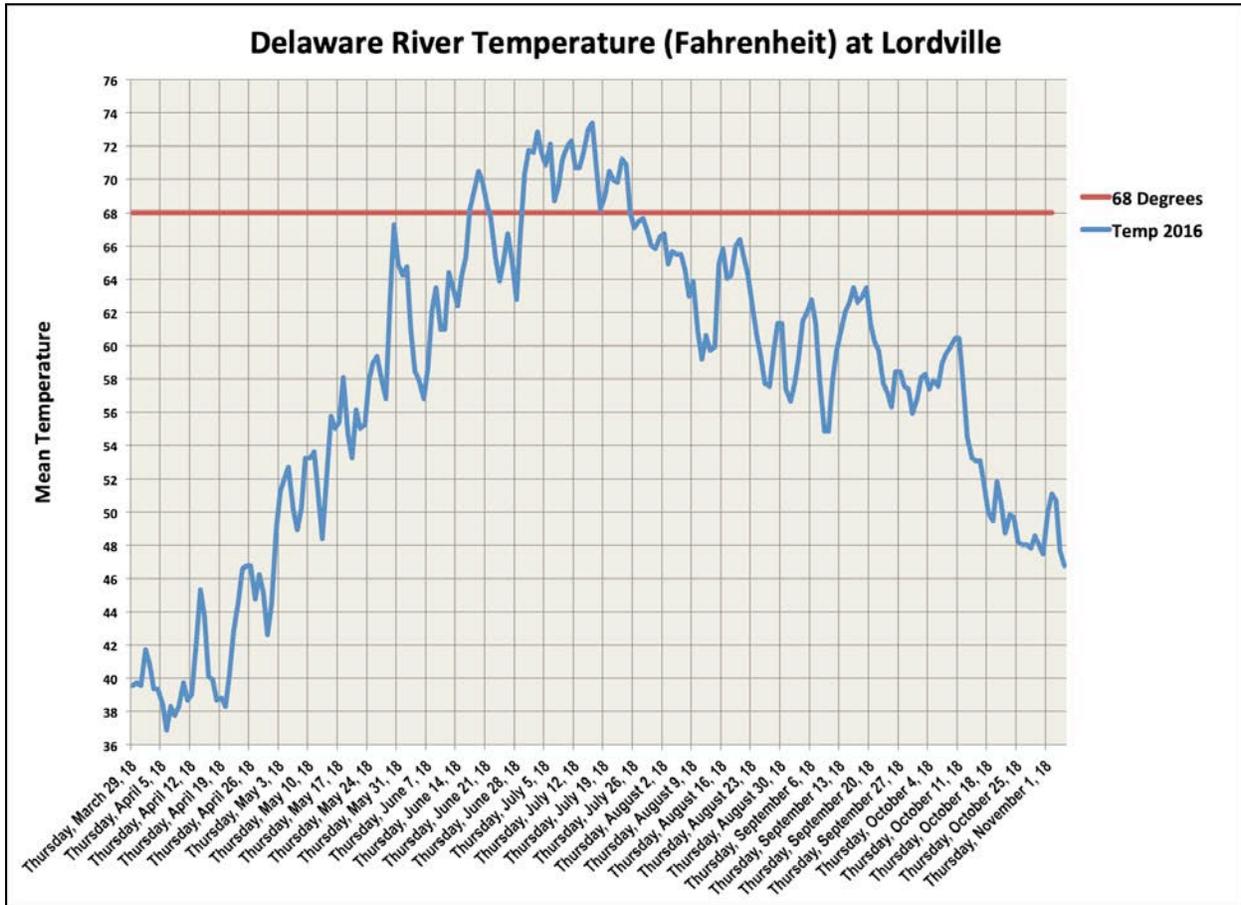
This makes it a good year for purposes of examining the positive impact of a more consistent pattern of reservoir releases on a local tourist economy that revolves around boating and fishing. There is also the fact waders benefit by somewhat lower flows than anglers fishing from boats, particularly if the temperature is correct for that sort of fishing.

Data for the East Branch was also examined, using an updated set of standards; 175 cfs of flow at the Downsville Station and 250 cfs at the Harvard Station, the latter being roughly halfway between the Pepacton Reservoir dam in Downsville and the mouth of the Beaverkill.



The flows have widely varied as they did when last examined. The 2018 flows, though, produced desired stream levels in the case of 21 weekends at Downsville and 24-25 at Harvard. This means Pepacton releases yielded fishable conditions at Harvard for all but seven weekends.

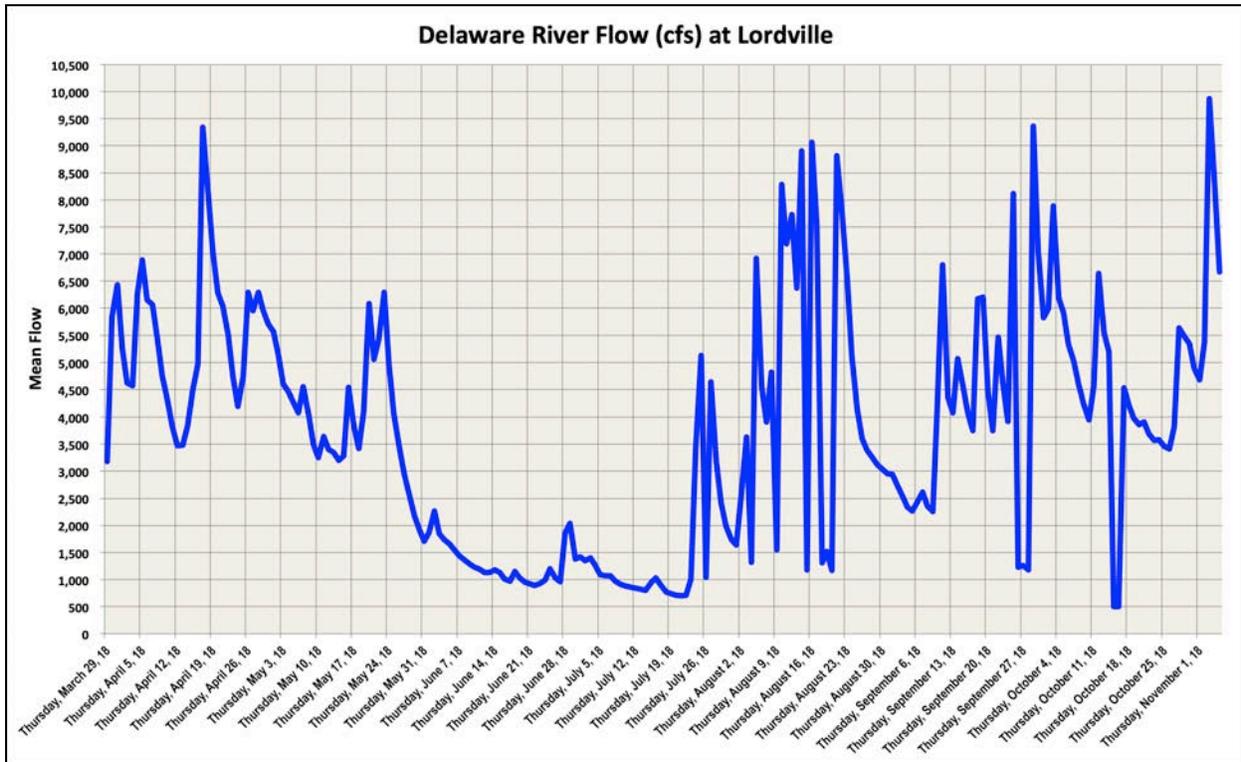
Temperature is a key factor in fishability for the main stem of the Delaware River. The following chart displays 2018 temperature changes for the main stem at Lordville, as compared to a desirable maximum temperature of 68 degrees Fahrenheit:



There were only five weekends where the average river water temperature exceeded 68 degrees. This is a major improvement over 2012, for example, when there were fully 12 such weekends. This means the main stem of the Delaware river was “fishable” for the vast majority of weekends in the year 2018.

Nonetheless, fluctuations in flows at Lordville were considerable with very low flows from late May through mid-July. The chart

following illustrates the pattern, which includes spikes in April, August, September and late October.



Overall, the data examined in 2014 indicated the impacts of uneven releases were quite damaging to realizing maximum fishing potential, with a minimum of a third and as many as 40% of weekends being negatively affected. The economic impact of those weekends when flow was adequate was huge but could have been much greater.

The 2018 data shows very much progress in the right direction, with only seven or 22% of weekends being negatively affected by low flows. Therefore, 2018 provides a basis for re-examining economic impacts to ascertain the value of more even flows throughout the fishing season. This is the subject of the next section.

4.0 Potential Gains from Consistent Releases

4.1 Potential Value of Consistent Cold Water Releases

Section 2.0 of this study began the process of accounting for economic impacts using national and state level data, but that undervalues the unique aspects of the affected area in terms of its extraordinarily high value as a fishery (the West Branch is a nationally recognized fishery), as well as a well-known canoeing and kayaking destination in the case of the main stem.

So as to gain a better perspective on the value of the resource economically, a survey was widely distributed to area businesses likely to be affected by the fishing and boating industry. A copy of the survey is attached.

Some 11 directly affected businesses responded with detailed data. These included realtors, fishing guides, restaurants, retail stores and lodging places; a small but very representative sample that accounts for about 7% of the businesses identified earlier as being located within the affected area. Eight were from Delaware County, two were from Wayne County and one was from Sullivan County, so the geographical representation was also good.

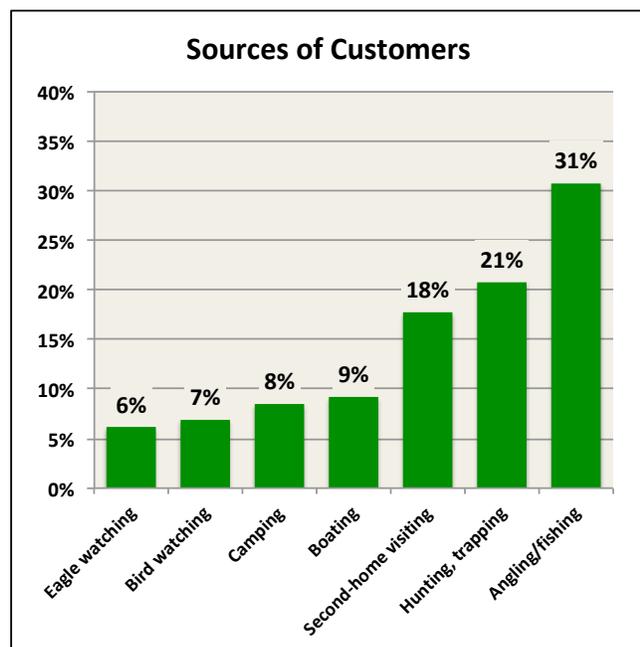
The following are the results:

- The typical business affected has been in existence approximately 33 years, but some have existed much longer.
- The average amount of land owned by respondents was 2.1 acres.
- Businesses were asked “How much of your customer base is related to each of the following activities, in your estimation?”

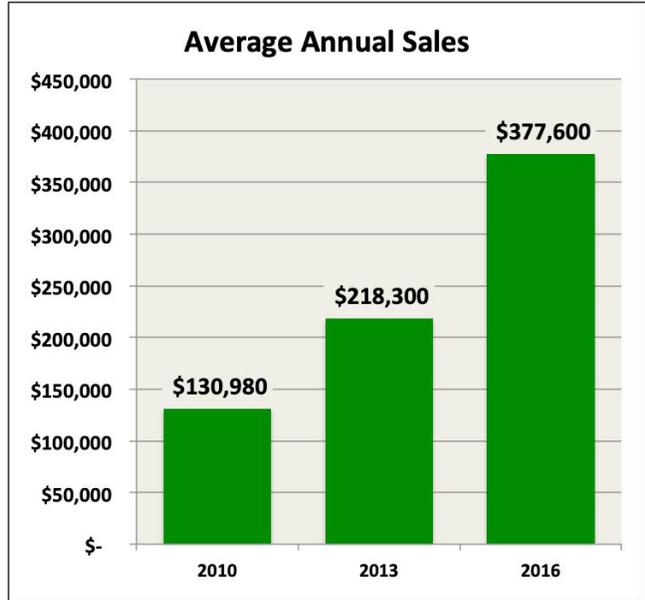
This was explained as follows:

“That is to say how many of your customers do you estimate come to the area for these activities and, in the course of their visits visit your business or use your services, regardless the services you provide directly relate to these activities or not?”

The responses are indicated in the self-explanatory chart to the right. It indicates angling/fishing is the predominant source of customers.

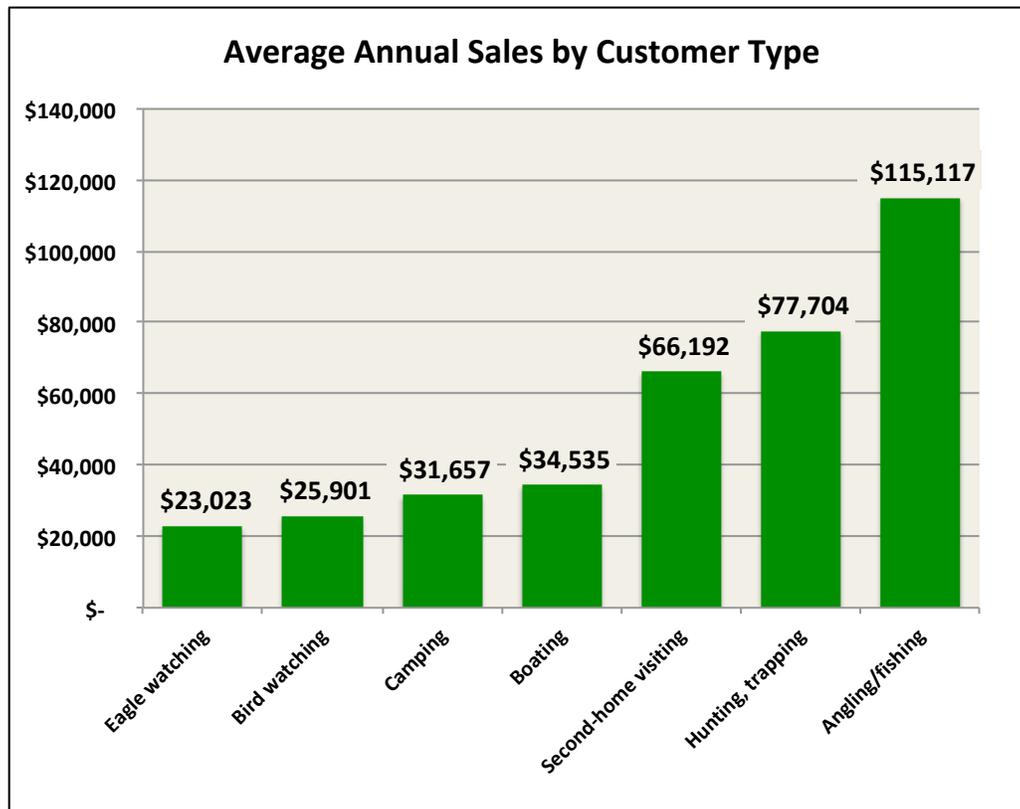


- The average sales of businesses answering the survey in the case of the previous study amounted to \$130,980 for 2010 and \$218,000 for 2013, but the 2015-2017 number (presumed to be a conservative representation of 2018) from the latest survey was \$377,600. Sales climbed significantly as the chart to the right plainly illustrates:

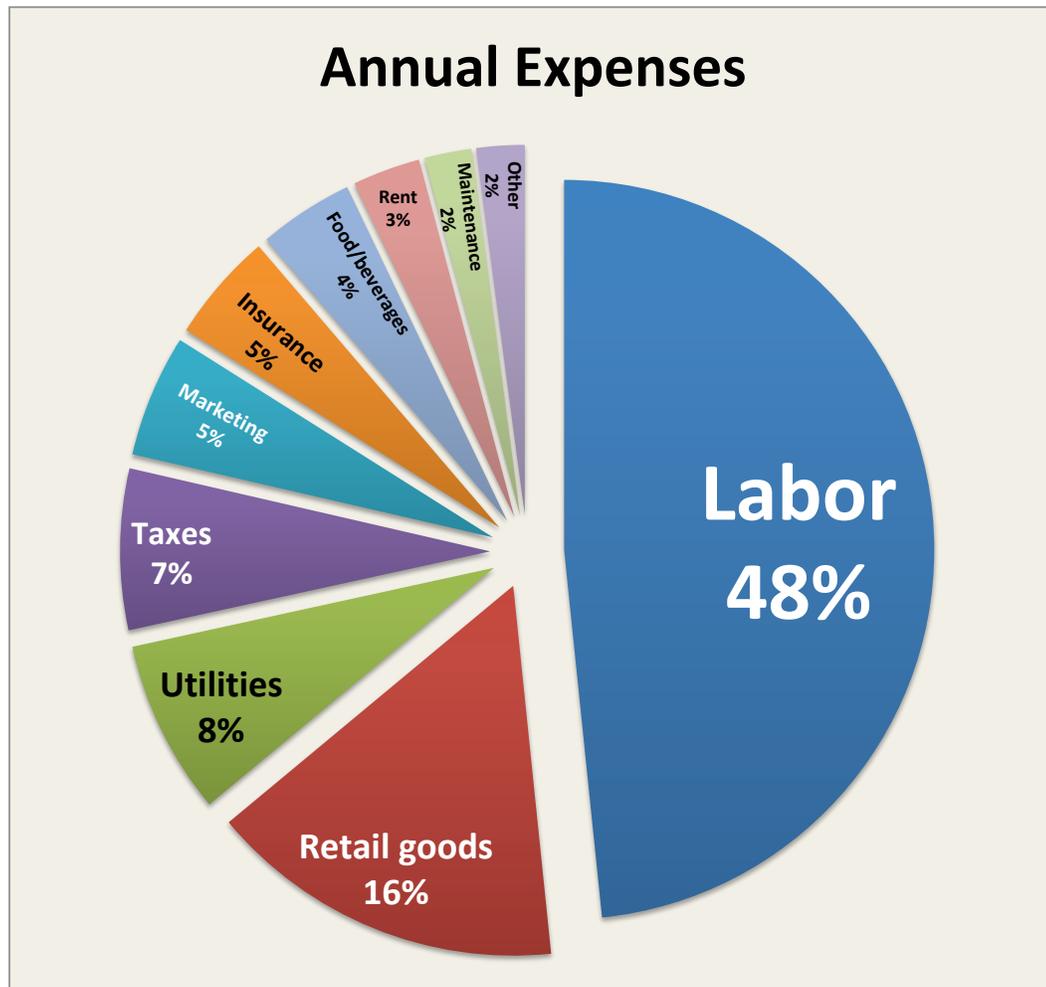


The two surveys relied, to some extent, upon data from different businesses, so comparisons are difficult. Nonetheless, there was significant overlap and the results do suggest 2018 was a very good year financially for many of the businesses surveyed.

- Those sales, allocated by proportions businesses attributed to various recreation pursuits, indicated the following average expenditures per year; fishing and boating alone (including [38% of camping and second home activity](#)) accounting for average spending of \$152,300 at each business:



- Expenditures by these businesses generate significant ripple or multiplier effects across the economy, as the following chart illustrates:



- Affected businesses have been spending heavily on new capital items to grow their enterprises and plan to spend much more in the next five years:

Average Capital Expenses		
Category	Last 5 Years	Next 5 Years
Buildings	\$ 18,250	\$ 34,286
Equipment	\$ 10,857	\$ 27,571
Land	\$ 22,500	\$ 5,833
Other	\$ 1,583	\$ 1,200
Totals	\$ 53,190	\$ 68,890

- Affected businesses spend an estimated 57% of their operating expenditures and 83% of their capital expenditures within Broome, Delaware, Sullivan or Wayne Counties.
- Affected businesses are drawing new dollars into the immediate region with 84% coming from outside it to experience recreational opportunities in the area.

Customers by Region	
Category	Share
Home county	16%
Adjoining counties	7%
Elsewhere in PA	13%
Elsewhere in NY	20%
New England	9%
New Jersey	21%
Other states	12%
Other countries	2%
Total	100%

- The typical business employs an average of 4.5 full and 5.5 part-time workers.
- Businesses were asked “How much more business could you generate if reservoir releases were more consistent and provided for a full uninterrupted cold water fishing season?” The average was \$115,980 or 31%. Applied to the two categories of customers most affected by cold water releases, anglers and boaters, this is equal to average additional revenue of \$47,213 per business, or another \$7,365,000 annually; \$18,092,000 if all categories are considered.

The generalized analysis from Section 2.0 led to a baseline estimate of \$15.3 million spent by anglers alone at the 156 businesses inventoried in the Census of Commerce, or \$98,000 each on average before multiplier effects of indirect and induced spending. The survey data suggests boating, combined with 38% of camping and second home related sales, would grow this number to \$130,700. The survey data, using a different approach, indicates the combined number for anglers and boaters, together with campers and second home visitors primarily engaged in angling and boating, all of whom are directly affected by cold water releases, is more likely \$152,300.

The average number derived using these two different approaches is \$141,500, which yields a conservative total annual direct economic impact of \$22.1 million plus another \$18.6 million of

indirect and induced impacts for a combined existing economic impact of \$40.7 million. This income stream, net present valued over 20 years at a discount rate of 5%, is \$507 million.

Moreover, there is substantial additional business that those surveyed indicate is realizable with more consistent cold water releases. If [31% of prime angling and boating time is already negatively affected](#) by uneven releases (down from 40% in 2014 due to improved flows), which appears to be reasonable based on the foregoing, there is a potential gain of \$18.3 million annually. Alternatively, if the five weekends out of 32 with flows below 550 cfs at Hale Eddy (16%) is used as the basis for measuring potential, there is a potential annual gain of \$7.5 million. Averaging these two figures yields \$12.4 million, which, net present valued over 20 years at 5%, is worth \$161 million.

This is all before considering the [\\$252 million in second home values discussed earlier](#), which may also be expected to increase in value by a similar factor, adding another \$59 million of value that would be contributed by a more consistent cold water release regimen.

Altogether then, the final estimate of the current net present value of the cold water fishery, after considering both objective and subjective data sources, is an estimated \$759 million (\$507 million in economic activity plus another \$252 million in second home real estate values connected with that activity).

It is further estimated the value of the cold water fishery as both a boating and fishing resource, as well as a foundation for camping and second home visitation, would be enhanced by \$220 million with more consistent cold water releases (\$161 million in economic activity plus another \$59 million in second home real estate values connected with that activity).

What's A River Worth?			
	Existing Value	Potential Added Value	Total Potential Value
Fishing & Boating Industry	\$ 507,000,000	\$ 161,000,000	\$ 668,000,000
Second Homes	\$ 252,000,000	\$ 59,000,000	\$ 311,000,000
Totals	\$ 759,000,000	\$ 220,000,000	\$ 979,000,000

4.2 Benefits of Consistent Releases to New York City

The benefits of the cold water fishery and the boating, camping and second-home activity are not limited to the local and regional impacts, but also extend to New York City and New York State as a whole.

First of all, it must be remembered every dollar spent at the fishing destination by anglers is accompanied by [another 61 cents spent en route to the location](#) for clothing, food, gasoline, supplies, etc. This means another \$309 million is now being spent on boating and fishing related activities *outside the immediately affected area*, with the potential to add another \$98 million from more consistent releases. Assuming 75% of such new money is spent in New York, that's another potential \$5.9 million in sales tax revenue for these areas.

Secondly, many of these boaters and anglers come from the New York City metropolitan area. Some 52,000 fishing licenses are sold annually in New York City. They are direct beneficiaries of a vibrant boating and fishing industry in the region.

Most importantly, it is residents of the New York City metro area who own many of the second homes in the immediately affected region. A 2014 review of seasonal residence sales in the towns of Sanford, Deposit, Hancock and Fremont, which represent the four New York State communities along the West Branch and Upper Delaware portions of the study area indicated 21% of the buyers came from New York City and another 26% came from immediately adjoining parts of the metro area (not including Connecticut, New Jersey or Pennsylvania).

This means New York City residents potentially own as much as \$52.9 million of that \$252 million in home value related to boating and fishing. Their properties could gain as much as \$15.3 million in value from a more consistent cold water releases protocol.

Finally, it is important to recognize the aesthetic, cultural and historical value of the boating and fishing area to the region. It is a clear benefit to New York City residents to maintain those values as well within a region many of them call their second home or vacation area.

5.0 Conclusions

The recreational industry, particularly fishing, is one of the principle economic engines of the Upper Delaware region and is directly driven by river conditions. Some of these are influenced by natural weather patterns, but the majority result from the controlled cold water releases out of Cannonsville and Pepacton Reservoirs.

Virtually all anglers fishing in the area are connected to the internet, and therefore have instant access to current flow information and water conditions on the Delaware River and its branches. If the water flows are suddenly altered due to changes in release, they are unlikely to make the journey for a fishing trip that will likely be unproductive. As many fishermen tend to only be able to visit the fishery on the weekend, it is of particular importance that flows be consistent during those times.

During the 2011-2013 fishing seasons, there were an average of roughly 14-15 “lost” weekends of fishing due to inconsistent and/or low flows. These weekends also saw higher water temperatures which are detrimental to the wild trout population and adversely affect fishing opportunities. This correlated directly to a loss of business for not only the fishing industry, but all ancillary businesses in and around the river basin. Additionally, seasons characterized by poor flows had a tendency to discourage anglers from ever returning to the area, for fear of repeat conditions.

The year 2018, though, was much better, with only five sub-par weekends during the 32 week prime season. The results showed, with much improved economic conditions, although there is still considerable room for further improvement.

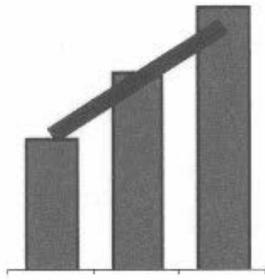


Indeed, while 2011-13 data suggested an existing fishing and boating industry worth \$305 million (before considering second homes) and potential to add another \$203 million, the 2018 data took those numbers to \$507 million and \$161 million, respectively. This indicates our original analysis was too conservative from the perspective of the potential unleashed by more even flows.

A more reliable, consistent pattern of water releases from the NYC Delaware River basin reservoirs is needed to address chronic thermal stress concerns, alleviate dramatic fluctuations in river flows, and provide more water at the right time to protect cold water habitat and enhance recreational opportunities in the Upper Delaware River.

Adoption of such a water management strategy for the NYC Delaware River basin reservoirs necessary step in the right direction and would create additional economic opportunities as a direct result of a better flow regime. While it would not totally remove the possibility of low-flow days during peak weekends, it would definitely reduce the number of those days dramatically to great economic benefit to the region as a whole.

APPENDIX



Shepstone
Management Company

Planning & Research Consultants

Upper Delaware River Fishing and Boating Economic Impact Survey 2018

Please help us document the economic importance of the Delaware River fishing and boating industry in relation to cold water reservoir releases by checking the appropriate box or by writing in the answer. All information is strictly confidential. Please do not use symbols such as "\$" or "%" when you enter any numbers. Also, please do not use commas, decimal points or quotation marks. To answer \$10,000 simply type 10000.

All information is strictly confidential and will be used only in the aggregate and for the purpose of documenting the economic contributions of the Delaware River (and branches) cold water fishery with a view toward developing a fairer reservoir release regimen that better supports the fishing and boating industries and extends their season.

Please complete this survey by July 15 if at all possible. Thank you very much!

1. Name of business or enterprise:

2. Principal county where your business or enterprise is located:

- Delaware County (NY)
- Broome County (NY)
- Sullivan County (NY)
- Wayne County (PA)

3. Address:

Street 1:

Street 2:

City:

Zip Code:

E-Mail:

Telephone:

Fax:

Website:

4. How long has your business or enterprise existed (regardless of ownership)?

Number of years:

5. How many acres of land does your business or enterprise occupy?

Number of acres:

6. How much of your customer base is related to each of the following activities, your estimation? That is to say, how many of your customers do you estimate come to the area for these activities and, in the course of their visits visit your business or use your services, regardless the services you provide directly relate to these activities or not?

	0%	1-25%	26-50%	51-75%	75-99%	100%
Angling/fishing	<input type="radio"/>					
Boating/canoeing/kayaking/rafting	<input type="radio"/>					
Bird watching	<input type="radio"/>					
Eagle watching	<input type="radio"/>					
Hunting/trapping	<input type="radio"/>					
Camping	<input type="radio"/>					
Second-home visiting	<input type="radio"/>					

Other (please specify)

7. What type of business or enterprise do you operate? Please check all that apply.

- | | | |
|---|--|---|
| <input type="checkbox"/> Auto service/transportation | <input type="checkbox"/> Fishing guide service | <input type="checkbox"/> Gift shop |
| <input type="checkbox"/> Boating/canoeing/kayaking | <input type="checkbox"/> Lodging facility | <input type="checkbox"/> Entertainment facility |
| <input type="checkbox"/> Grocery store | <input type="checkbox"/> Liquor store | <input type="checkbox"/> Museum or community facility |
| <input type="checkbox"/> Campground | <input type="checkbox"/> Bait and tackle shop | <input type="checkbox"/> Retail |
| <input type="checkbox"/> Convenience store | <input type="checkbox"/> Clothing store | <input type="checkbox"/> Real estate |
| <input type="checkbox"/> Restaurant (sit-down dining) | <input type="checkbox"/> Fishing school | |
| <input type="checkbox"/> Restaurant (fast food) | <input type="checkbox"/> Gasoline station | |
| <input type="checkbox"/> Other (please specify) | | |

8. What were your total revenues per year for the last 5 years (in dollars, but please don't use dollar symbols)? This information is extremely important to our survey, so please share it with the understanding it is strictly confidential. The data will only be used in collected format such that no individual data is ever disclosed. Once collected, the individual answers will be destroyed.

2009

2010

2011

2012

2013

9. Please estimate your average annually operating expenses (last five years) on each of the following items (in dollars, but please don't use dollar symbols)? If they are capital expenses, however, please record them in answer to the next question and NOT here.

Advertising and marketing

Entertainment expenses

Food and beverages

Insurance

Labor expenses

Maintenance and repairs

Rent (land, buildings or equipment)

Retail goods for resale

Taxes (sales & other)

Transportation/vehicular expenses

Utility expenses

Other and miscellaneous

10. How much capital have you invested in your facilities over the LAST 5 years combined (in dollars, but please don't use dollar symbols)? Please include all land purchases and investments in depreciable assets. Do not include operating expenses.

Buildings

Equipment

Land

Other and miscellaneous

11. How much capital do you plan to invest in your facilities over the NEXT 5 years combined (in dollars, but please don't use dollar symbols)? Please include all land purchases and investments in depreciable assets. Do not include operating expenses.

Buildings

Equipment

Land

Other and miscellaneous

12. What percentage of your purchases do you estimate are made within Broome, Delaware, Sullivan and/or Wayne Counties, as opposed to other areas (please do not use percentage symbols)?

Operating expenditures

Capital expenditures

13. How many individuals are directly employed by your business or enterprise?

Full-time

Part-time

14. How do you promote your business or enterprise? Please check all that apply.

- | | | |
|---|--------------------------------------|--|
| <input type="checkbox"/> Internet website | <input type="checkbox"/> E-mail list | <input type="checkbox"/> Social media |
| <input type="checkbox"/> Magazines | <input type="checkbox"/> Direct mail | <input type="checkbox"/> Placemats and brochures |
| <input type="checkbox"/> Newspapers | <input type="checkbox"/> Posters | <input type="checkbox"/> Word of mouth |
| <input type="checkbox"/> Newsletters | <input type="checkbox"/> Billboards | |
| <input type="checkbox"/> Radio | <input type="checkbox"/> Television | |
| <input type="checkbox"/> Other (please specify) | | |

15. The upper reaches of the Delaware River and its branches are cold water fisheries that support angling and certain other types of wildlife not found everywhere. How important is this cold water fishery to your business or enterprise?

- Not Important
 Important
 Very Important

16. Normally, how important are these various seasons to your business in terms of customer counts or visitors to your place of business? Use the following as a guide:

- 0-10% of Customers or Visitors = Not That Important
- 11-20% of Customers or Visitors = Somewhat Important
- 21-40% of Customers or Visitors = Important
- 41-60% of Customers or Visitors = Very Important
- 60-80% of Customers or Visitors = Extremely Important
- 81-100% of Customers or Visitors = All Important

	Not That Important	Somewhat Important	Important	Very Important	Extremely Important	All Important
Jan-Feb-Mar	<input type="checkbox"/>					
April-May-June	<input type="checkbox"/>					
Jul-Aug	<input type="checkbox"/>					
Sep-Oct	<input type="checkbox"/>					
Nov-Dec	<input type="checkbox"/>					

17. Normally, how important are these various seasons to your business in terms of SALES VOLUME? Use the following as a guide:

- 0-10% of Sales = Not That Important
- 11-20% of Sales = Somewhat Important
- 21-40% of Sales = Important
- 41-60% of Sales = Very Important
- 60-80% of Sales = Extremely Important
- 81-100% of Sales = All Important

	Not That Important	Somewhat Important	Important	Very Important	Extremely Important	All Important
Jan-Feb-Mar	<input type="checkbox"/>					
April-May-June	<input type="checkbox"/>					
Jul-Aug	<input type="checkbox"/>					
Sep-Oct	<input type="checkbox"/>					
Nov-Dec	<input type="checkbox"/>					

18. How much more business could you generate if reservoir releases were more consistent and provided for a full uninterrupted cold water fishing season?

- None
- 1-5% More
- 6-10% More
- 11-15% More
- 16-20% More
- 21-25% More
- 26-30% More
- 31-35% More
- 36-40% More
- 41-45% More
- 46-50% More
- More Than 50% More

19. Where do your customers come from (to the best of your knowledge)? Please indicate the percentage that comes from each location and make sure the total is 100% (but please do not use percentage symbols).

Home county

Adjoining counties

Elsewhere in Pennsylvania

Elsewhere in New York

New England

New Jersey

Other states

Other countries

20. Is there anything else you would like to tell us about the importance of the cold water fishery and the reservoir releases to maintaining it?